Synopsis proposal of Ph.D on

Identify the parameters of the effect of stress on the body's medical parameters by using machine learning algorithm and human computer interaction

A Synopsis

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Introduction

Stress is one of the main causes of health problems in the modern world. Heart rate, galvanic skin response, body temperature, and blood pressure are the fundamental indicators of stress and give precise information about a person's mental state. Based on factors including age, gender, and physical condition, these criteria differ from person to person. The system's primary objective is to analyse mental stress using physiological data from an electrocardiograph in various postures and states of mind. For the detection of stress, many pre-processing approaches might be applied. The integer wavelet packet transform can be used in feature extraction [1]. Machine learning algorithm can be used with various classifiers to get more accurate results.

One of the most recent study topics is stress detection. The identification of human anxiety has made various strides thanks to wearable sensors and bio-flag training.

Stress is a natural bodily response to a crisis that enables people to overcome some obstacles or avoid some dangers in order to survive. Heart rate, skin conductivity, breathing rate, understudy expansion, muscle compression, and other physiological characteristics vary [2].

Also, unwanted stress is a part of life that people experience. Although stress can sometimes be beneficial, if it persists for a long period, it can be harmful to your health. Therefore, it is essential to identify someone's stress because it can cause sadness. Stress has been shown to worsen health conditions. Stress has been discovered to have a negative impact on health by raising blood pressure, lowering body oxygen levels, and causing weight gain. Obesity may result from it. A consistent shift in BMI is another sign of stress. The health of humanity is under danger from stress. Your body releases a hormone in response to stress that accelerates your breathing and heart rate. These parameters play a crucial role in identifying stress [3].

It is well known that the human body responds to external influences in a significant way. Stress [4], [5] is the term used to describe the body's reaction to these outside influences. Stressful situations cause a number of physiological and psychological processes to be triggered. Stress causes a significant increase in the aging-related physical wear and tear. Chronic stress reduces the body's ability to defend itself and impairs the immunological and cardiovascular systems of a person. Stress weakens the

immune system, making a person more vulnerable to infections and chronic conditions like diabetes, hypertension, and asthma [6].

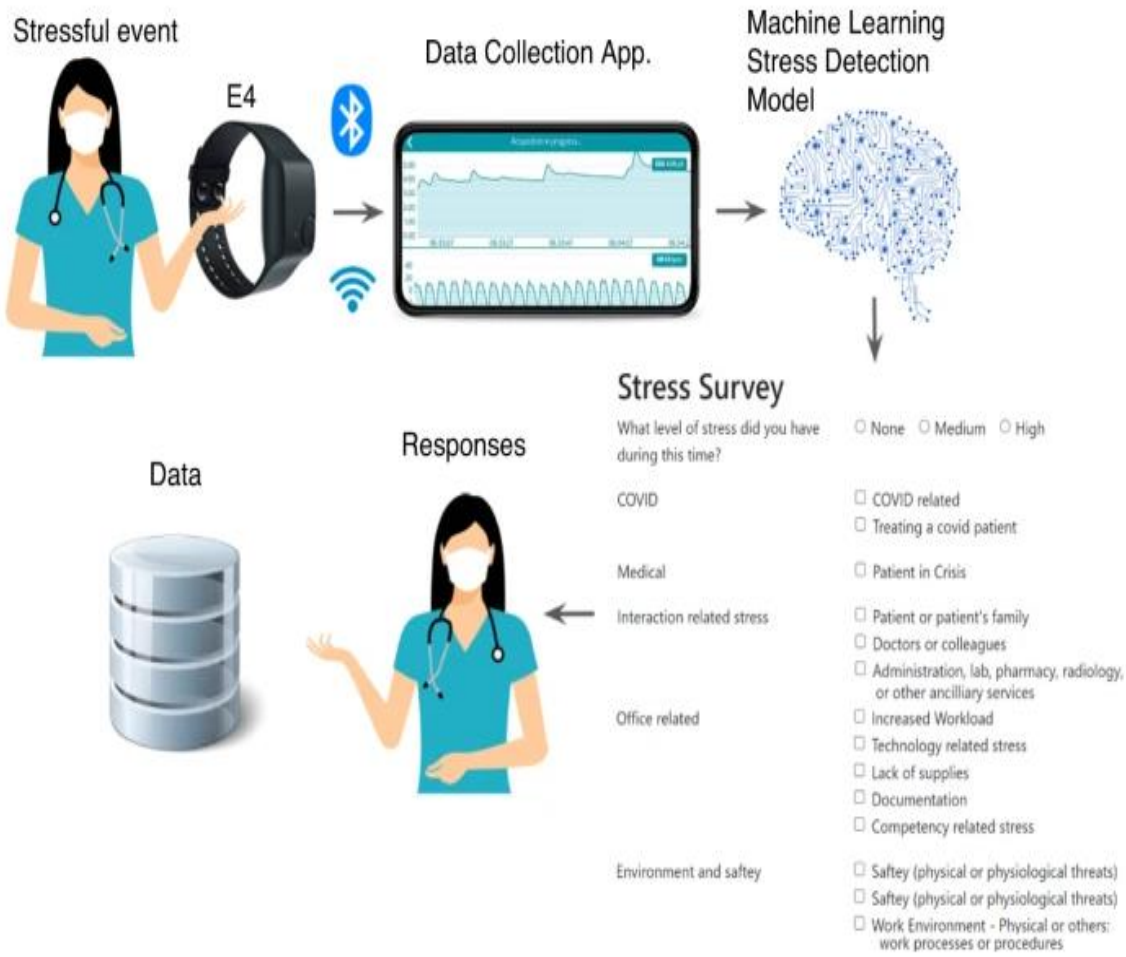

Figure 2: Stress detection Apparatus [17]

With the help of machine learning algorithms we can effectively identify the parameters to evaluate the effect of stress on body's medical parameters by generating dataset from various age groups and diversifies professionals.

The study of stress necessitates an assessment of three domains:

(1) The presence of environmental stressors,

(2) Psychological and biological reactions to stressors, and

(3) The length of time during which the stressor or stress response occurs.

Multiple methodologies are required for research in all three disciplines. Self-reports enable subjective assessments of stress that shed light on the duration and severity of the psychological reaction to stresses. In turn, biomarkers provide a more objective assessment of stress and a greater knowledge of the biological response to chronic and

acute stress. Finally, the use of digital biomarkers enables for further investigation of the physiological oscillations generated by stress by quantifying changes that occur concurrently with the stressor.

Objectives

The objectives of the proposed work are following:

I. Make individuals aware of their physical condition.

II. Survey and collection of values of parameters, through Human Computer Interaction (HCI), on which stress can be identified like heart rate, galvanic skin response, body temperature, blood pressure, BMI under consideration of three domains that are:-

- The presence of environmental stressors
- Psychological and biological reactions to stressors
- The length of time during which the stressor or stress response occurs

to generate Accurate dataset for identifying effect of stress on body's medical parameter using Machine Learning algorithm

III. Analyze Machine learning algorithms which suited best to detect required effect.

IV. Evaluation of the body's medical parameters to summarise the valid parameters that can best reflect the level of stress.

Methodology

The aim of this study is to identify the parameters of the effect of stress on the body's medical parameters by using machine learning algorithm and human computer interaction. The methods used in the present study are divided into following sections as given below-

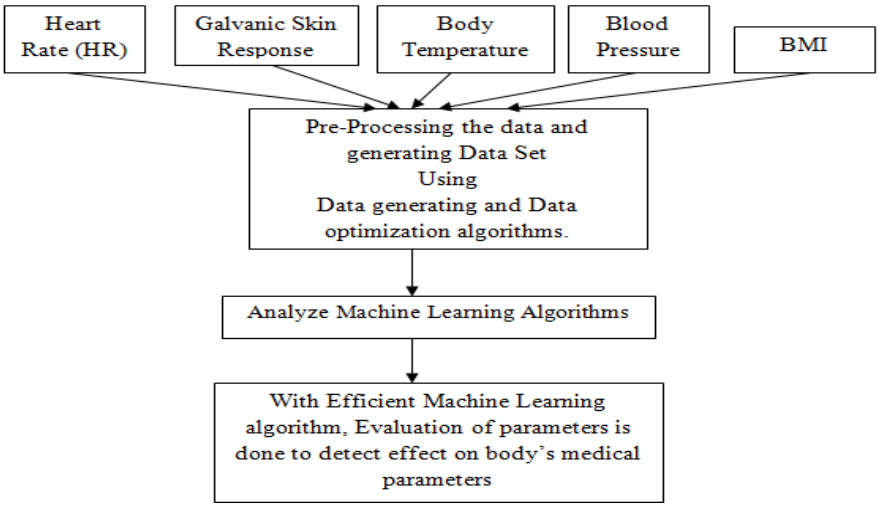
Heart Rate (HR)
Galvanic Skin Response
Body Temperature
Blood Pressure
BMI
Pre-Processing the data and generating Data Set Using Data generating and Data optimization algorithms.
Analyze Machine Learning Algorithms
With Efficient Machine Learning algorithm, Evaluation of parameters is done to detect effect on body's medical parameters

Figure 2: Work Flow To identify the parameters of the effect of stress on the body's medical parameters by using machine learning algorithm and human computer interaction

- Survey of various body's medical parameter like heart rate, galvanic skin response, body temperature, blood pressure, BMI considering various stressors.
- Gathering information from diverse age groups and professional groups.
- Generating data set using data science's algorithms namely, data generating and data optimization algorithms.
- After analyzing Machine learning algorithms, Efficient Machine learning algorithm is applied to detect effect of stress on body's medical parameter.
- Evaluate all body's medical parameters to summarise the valid parameters that that can best reflect the level of stress.

Significant outcome of the research work

- This work will help to identify stressed person using parameter like heart rate, galvanic skin response, body temperature, blood pressure, BMI.
- This work will help person to better comprehend their anxiety designs and furnish doctors with more solid information for mediations.
- This work will provide the rationale for exposing the neural networks to a dataset representative of the entire human population is that the sensitivity level of stress conditions (i.e., under what circumstances a person experiences stress) is individual-based and varies from person to person.

- With this work I will demonstrate the potential of deep neural networks for developing robust, continuous, and noninvasive methods for stress detection and emotion classification, with the end goal of improving the quality of life.
- With the help of this work individuals will be able to work on stressors to reduce stress and be healthy mentally and physically both.

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